

New utility "Beam energy scanning"

v.15.14.5
03/25/21

- Calculations
- Utilities
- 1D-Plot
- 2D-Plot
- Database
- Goodies
 - Calibration tools
 - Transmission and rate
 - Optimization
 - Monte Carlo calculation of transmission
 - Calculators
 - Optimum Target
 - Optimum Target-Wedge and Wedge-Wedge configurations
 - Optimum Charge State combination
 - Beam energy scanning (fixed brho's, target & wedges)
 - Brho scanning (fixed beam, target & wedges)

Beam energy scanning ==> set beam parameters: nuclide, energy region

A	Element	Z	Table of Nuclides	
54	Fe	26	← Z →	
	Stable		← N →	

Energy scanning region

Energy_{MIN} = 98 MeV/u

Energy_{MAX} = 168 MeV/u

Choose the rectangle to calculate background

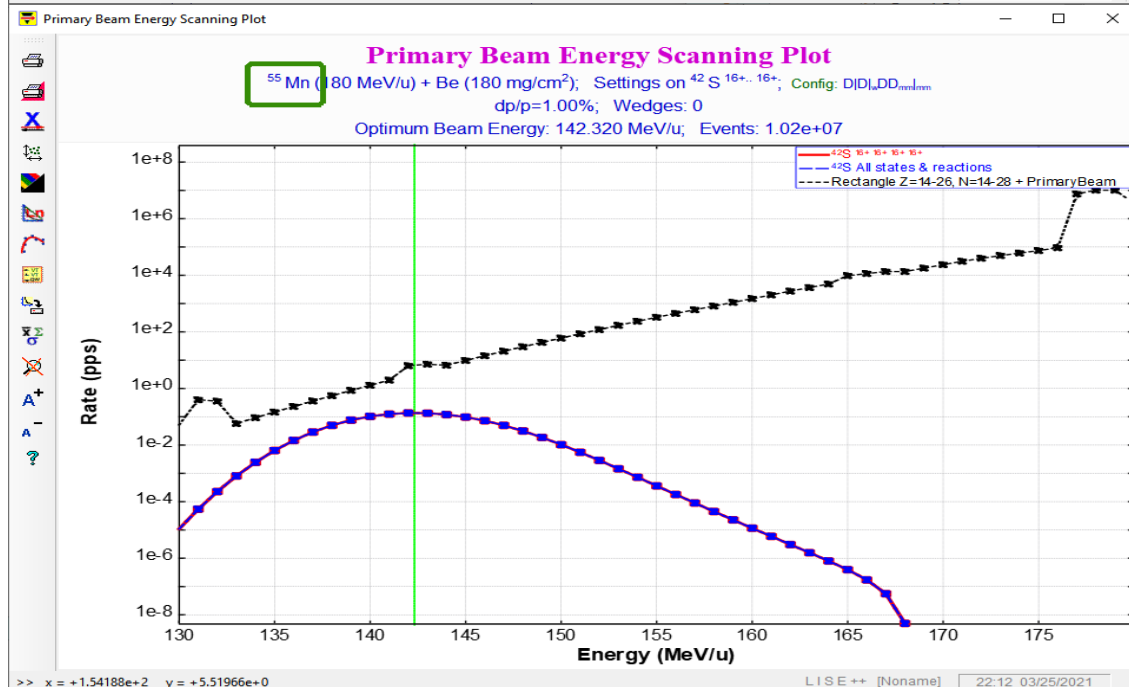
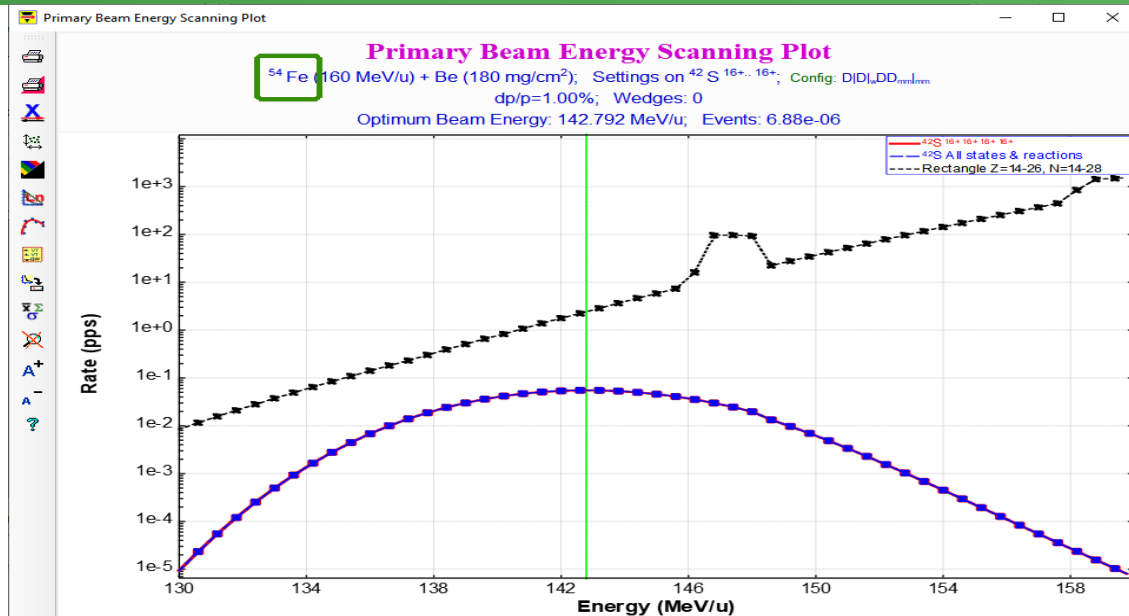
		Z	N
1 st corner →	28Si	min 14	14
2 nd corner →	54Fe	max 26	28

Calculate a background rate

Number of points

Calculate the primary beam transmission if the primary beam is out of the rectangle

Scan Cancel



15.11.2 02/22/21

New calc parameter : transmission information without secondary reactions

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Transmission statistics: 41Al

Save As Print Transmission analysis LISE database Decay analysis Bra

⁴¹Al Beta- decay (Z=13, N=28) Aluminum

Q1 (D1)	13
Q2 (D2)	13
Q3 (D3)	13
Q4 (D4)	13
Reaction	ProjFrag

Ion Production Rate (pps)	3.15e-3
Total Ion transmission (%)	1.76e+2
TI transmission no SR (%)	27.583
Total: All reactions (pps)	3.15e-3
X-Section in target (mb)	2.15e-9

Target (%)	5.19e+2
Unreacted in material (%)	81.48
Unstopped in material (%)	100
Secondary Reactions (coef)	6.37

Transmission WITH secondary reaction factor

Transmission WITHOUT secondary reaction factor

secondary reaction factor

- 00 Ion Production Rate (pps)
- 01 Total: this reaction (pps)
- 02 Global ISOTOPE transmission for all reactions [%]
- 03 Total: All reactions (pps)
- 04 X-Section in target (mb)
- 05 X-Section in stripper (mb)
- 06 Total ION transmission for selected reaction [%]
- 07 TI transmission no SR (%)**
- 08 Energy After Target (MeV/u)
- 09 Energy deviation (MeV/u)
- 10 Target - Block transmission (%)
- 11 Target - X space transmission (%)
- 12 Target - Y space transmission (%)
- 13 Target - X angular transmission (%)
- 14 Target - Y angular transmission (%)
- 15 Target - Unreacted in material (%)
- 16 Target - Q (Charge) ratio (%)
- 17 Target - Unstopped in material (%)
- 18 Target - Secondary Reactions (coef)
- 19 Stripper - Block transmission (%)

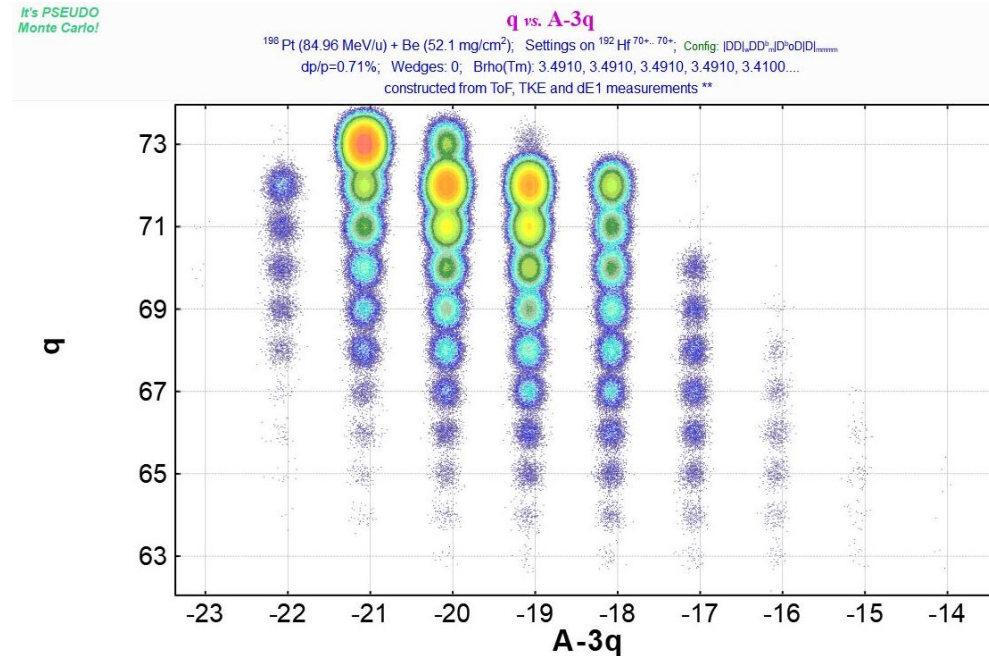
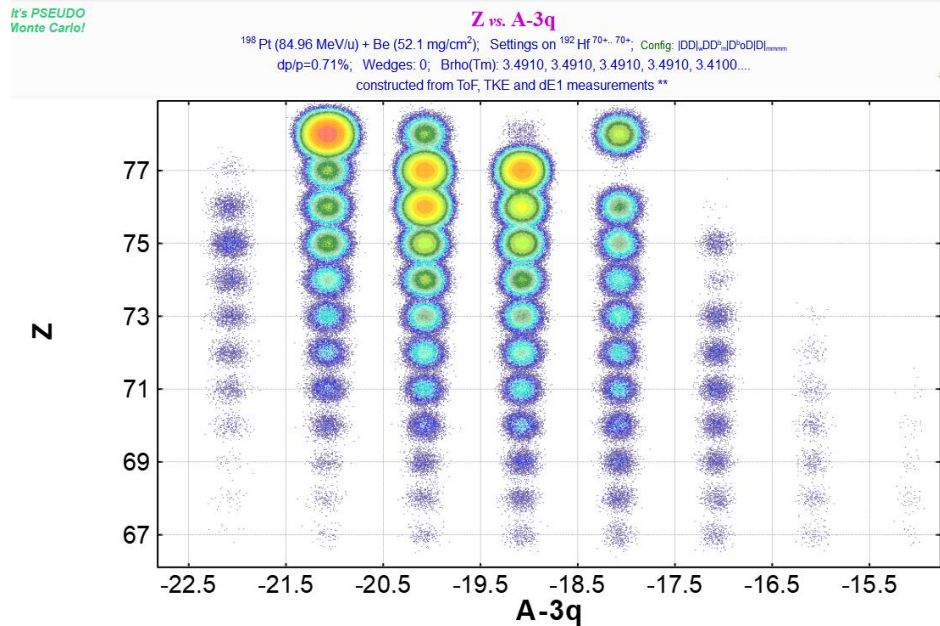
LISE file is compatible with previous versions.
New calc. parameter is recalculated on the base of other saved calculated values

It is efficient for extended configurations

D	tuning12	$B\rho=3.0000\text{ Tm}$	E	<input checked="" type="checkbox"/>
d	z015	standard : 39.6 cm	e	<input checked="" type="checkbox"/>
Q	Q017TA	QUAD : 10.475 kG	e	<input checked="" type="checkbox"/>
d	z018	standard : 17.56 cm	e	<input checked="" type="checkbox"/>
Q	Q019TB	QUAD : -9.7677 kG	e	<input checked="" type="checkbox"/>
F	Fit z19R	s R < 100	e	<input checked="" type="checkbox"/>
d	z020	standard : 17.2 cm	e	<input checked="" type="checkbox"/>
Q	Q021TC	QUAD : 7.057 kG	e	<input checked="" type="checkbox"/>
d	z022	standard : 3 Tm	e	<input checked="" type="checkbox"/>
F	D1-Y	s Y < 45	e	<input checked="" type="checkbox"/>
D	D1	$B\rho=3.0000\text{ Tm}$	E	<input checked="" type="checkbox"/>
F	D1-X	s X < 100	e	<input checked="" type="checkbox"/>
d	z030	standard : 56.4 cm	e	<input checked="" type="checkbox"/>
Q	Q031TA	MULT : 8.5903 kG	e	<input checked="" type="checkbox"/>
d	z032	standard : 13.58 cm	e	<input checked="" type="checkbox"/>
Q	Q033TB	MULT : -10.584 kG	e	<input checked="" type="checkbox"/>
config	A1900_extended_LISE		total	
option	A1900_2019		dp/p	
version	15.26.1		5.07%	

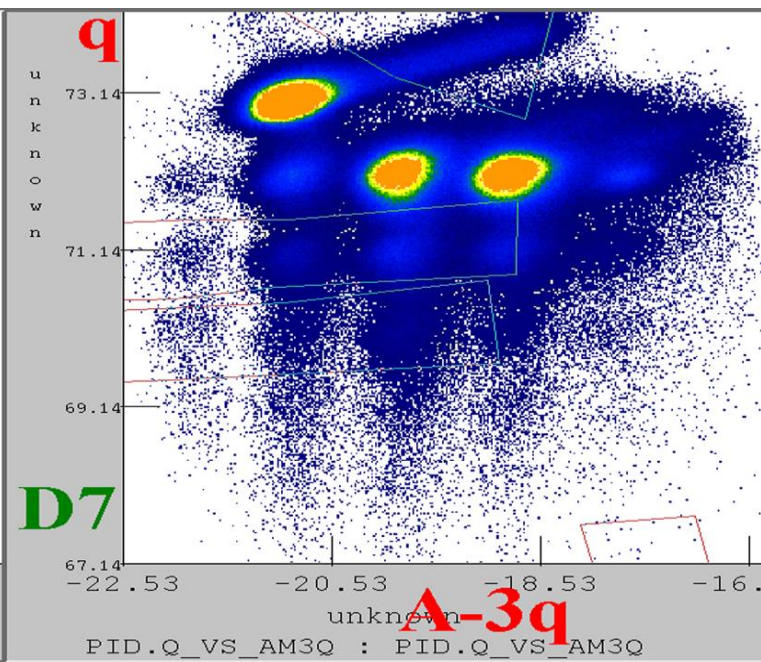
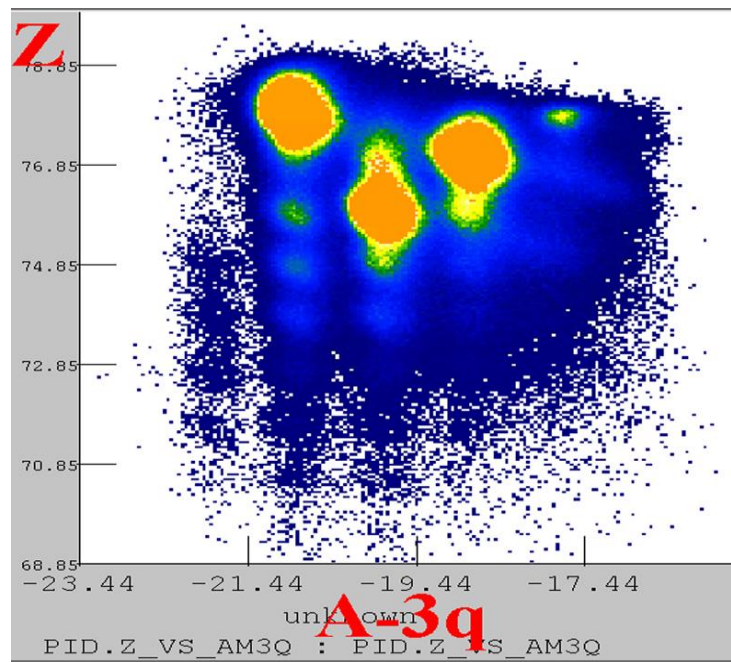
D	** Dipole	tuning12	0	0
d	drift	z015		0.396
Q	<Quad>	Q017TA		0.748
d	drift	z018		0.176
Q	<Quad>	Q019TB		0.748
F	Fit	Fit z19R		0
d	drift	z020		0.172
Q	<Quad>	Q021TC		0.43
d	drift	z022		0.526
F	Fit	D1-Y		0
D	** Dipole	D1	0	2.43
F	Fit	D1-X		0
d	drift	z030		0.564
Q	<Quad>	Q031TA		0.43
d	drift	z032		0.136
Q	<Quad>	Q033TB		0.812
d	drift	z034		0.136
Q	<Quad>	Q035TC		0.43
d	drift	z036		0.586
F	Fit	I1-focX		0
F	Fit	I1-focY		0
F	Fit	I1-AD		0
F	Fit	I1-XX		0
F	Fit	I1-T324		0
A	FaradayCup	FaradayCup 1		
S	slits	Imaee1(037)		0

LISE simulation



Good production intensity and position agreement!

Experiment



v.15.13.2
03/05/21

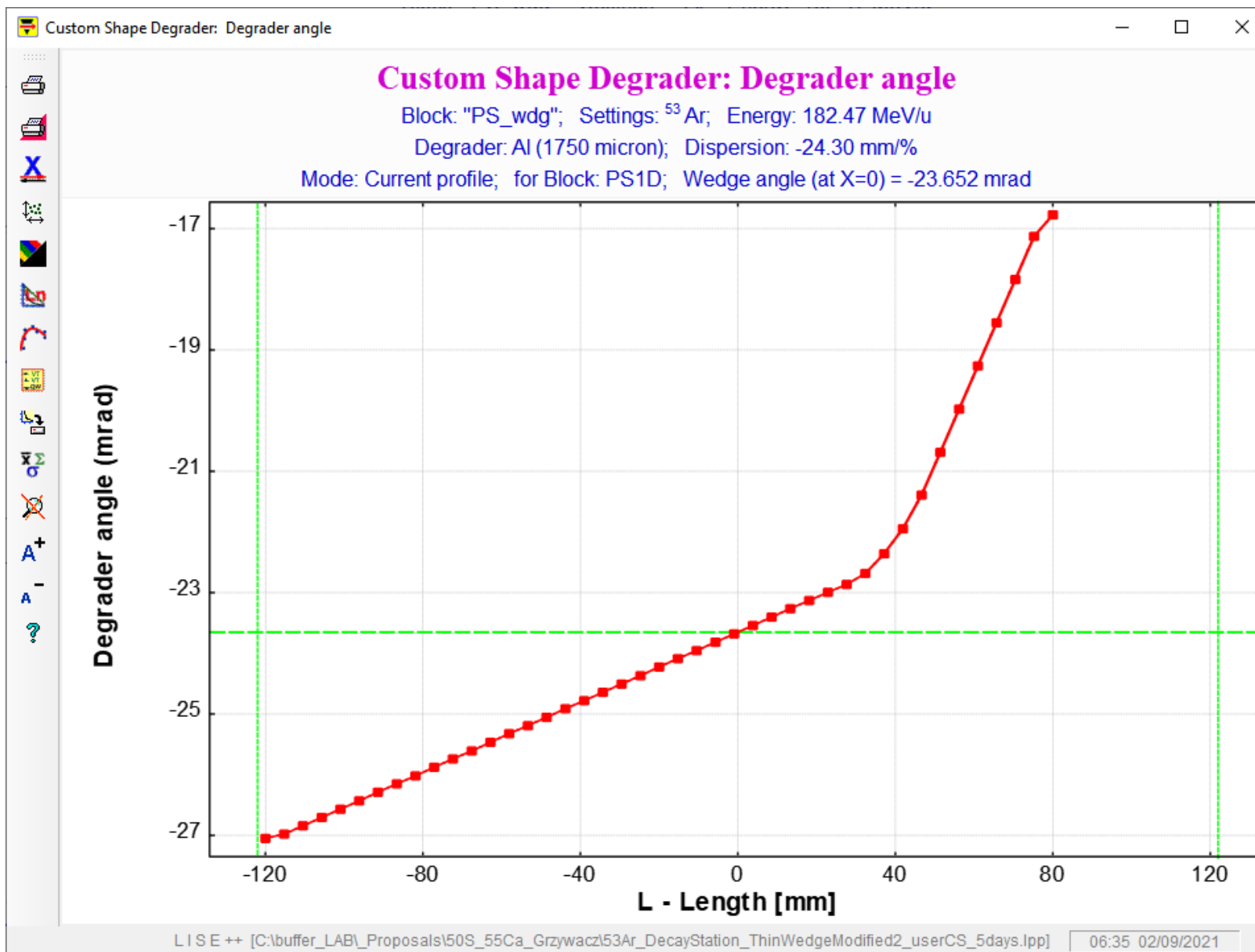
- Utilities update

03/05/21

http://lise.nsl.msu.edu/15/15_13_2_utilities.pdf



LINK: http://lise.nsci.msu.edu/15/15_9_1_UserWedge.pdf



LINK: http://lise.nsci.msu.edu/15/15_1_6_DiffCS.pdf

Differential CS file

v.15.1.6
01/04/21

- Correction of Isotope Differential Cross Section information in LISE file

Reading a DiffCS file from disk and keeping information in LISE++ file

The dialog box shows the following fields and controls:

- Table of Nuclides:** A grid with columns A, Element, Z. Values: 42, S, 16. Buttons for Beta-decay, Z, N, and arrows.
- Number of saved cross sections:**

	All CS	Intgd CS	Diff CS
All reactions	1	0	1
This reaction	1	0	1
- Projectile_Target:** $^{40}\text{Ca} + \text{Be}$
- Input new Intgd CS:** 2.21e+01 mb
- Input (View) Diff CS:** 190_gs.bt
- Selected Reaction:** Two body reaction
- Integral cross sections from models for selected reaction:** (Empty text area)
- Buttons:** Delete Current CS, Delete All user cross sections, Quit.
- Footer:** Intgd CS - Integrated Cross Section, Diff CS - Differential Cross Section, Preferences: cross sections from (set in the "Preference" dialog), FILE.

```

C:\USEcate\instal\file\temp\filecsp
Save As Print

[===== Userz DIFF CS =====]

[DIFFCS0000]
CorrelatedTo=0
Filename=190_gs.txt
Comment= J.Wiza et al., PhysRev 143 (1964) 476 -- Ground state 180(p,d)190* !!!DEGREES
Ex12 = 0.000 0.000
NofPoints = 25
0 10.0837
4.913 9.603
13.27 9.6774
20.043 9.166
29.181 8.7714
37.36 4.6251
46.009 2.628
52.800 1.7652
59.254 1.5278
67.596 1.2505
76.33 1.2466
91.113 0.6166
96.809 0.6121
103.64 0.4527
111.24 0.5665
119.21 0.563
126.43 0.5597
133.26 0.5176
139.71 0.3975
147.69 0.5111
154.9 0.5079
160.98 0.5443
167.81 0.4239
174.65 0.5381
180 0.533014
    
```

LINK: http://lise.nsci.msu.edu/15/15_1_3_Z_vs_MaterialThickness.pdf

v.15.1.3
12/30/20

Z-axis vs. Material Thickness

The dialog box shows various options for MC transmission. A red box highlights the option "Use material thickness in separator length (default: NO)" under the "Use only at the end of separator" section. A blue arrow points to this option with the text "Help-file will be done later".

The Ray-generator dialog

A list of parameters for the Ray-generator dialog, including X [mm], Y [mm], Energy [MeV], and Z-begin [m]. The "Z-begin [m]" parameter is highlighted in blue.

Oleg Tarasov @ MSU 12/30/2020 1